Flush-fitting scleral contact lenses of the invention may then be produced by heating a sheet of material characterized by an index of refraction approaching that of human tears to a temperature sufficiently high to permit the sheet material to conform to the surface of the mold upon the application of pressure. After cooling, the resulting lens is taken from the die and the anterior surface machined and polished to provide the desired optical surface.

As above noted, a flush-fitting corneal lens, as illustrated in FIG. 3, can be prepared by cutting away the scleral band of the flush-fitting scleral lens, and treating the edges of the corneal lens so that a comfortable fit may be attained.

As will be appreciated by those skilled in the art, it is also possible to prepare contact lenses in accordance with the invention through the use of conventionally available measuring devices such as the Radioscope, the Keratometer and the Toposcope. While such devices may be used to produce contact lenses whose posterior portions closely approximate the anterior segment of the eye, such lenses will not provide as satisfactory a fit as will be obtained from the flush-fitting lenses described above.

In order that those skilled in the art may better understand how the present invention may be practiced, the following examples are given by way of illustration and not by way of limitation. The lenses of examples 1—3 inclusive were prepared from the respective polymer films which were heated to their softening temperature and subsequently draped over the stone mold of a patient's eye. A female mold roughly conforming to the shape of the stone mold was then quickly pressed onto the polymer film and held tightly against it until the polymer hardened. Except for the HFE/TFE/E terpolymer (which was found to be inherently hydrophilic) the lenses constructed from the other polymers were treated to impart wettability.

*Example 1*

A terpolymer was prepared by reacting hexafluoroacetone, tetrafluoroethylene and ethylene in a mole ratio of 1.6:1.0:1.0, the hexafluoroacetone being in the form of a 1:1 mol complex with methanol. The resulting polymer was characterized by an index of refraction of 1.392, a Knoop hardness of 8.6 and a molding temperature of 230°C. As previously mentioned, the polymer exhibited inherent wettability. A good scleral lens was molded from this polymer and appeared frosted, due to the irregular contour of the posterior surface of the lens. This frosting was substantially reduced when the lens was placed in water.

*Example 2*

A scleral lens was molded from polyperfluoroalkylethyl methacrylate of the formula

$$CF_3-CF_2-\left(CF_2-CF_2\right)_n-CH_2-CH_2-O-\overset{O}{\overset{\|}{C}}-\underset{CH_3}{\underset{|}{C}}=CH_2$$

The polymer was obtained by polymerizing a mixture of monomers of the above formula in which mixture the monomer weight fractions were as follows: $n$=1, 1 percent; $n$=2, 50 percent; $n$=3, 35 percent; $n$=4, 7 percent; $n$=5, 1 percent. The resulting polymer had an index of refraction of 1.374 and a Knoop hardness of 2.03. Its molding temperature was about 130°C. A good scleral lens was produced from this polymer which appeared partly frosted on its posterior side and was opaque when viewed in air. However, the lens became fairly transparent when placed in water.

*Example 3*

By the method outlined above, a scleral lens was obtained from a polyperfluoroalkylethyl methacrylate of the formula set forth above in which $n$ equaled 3. The resulting polymer was characterized by an index of refraction of 1.368, a Knoop hardness of 2.08 and a molding temperature of 140°C. A good scleral lens was obtained from the material. The posterior aspect of the lens appeared frosted and the front surface was fairly smooth. The lens was opaque when viewed in air but became essentially clear when immersed in water.

*Example 4*

A contact lens was prepared from a copolymer of tetrafluoroethylene and perfluoro-2-methylene-4-methyl-1,3-dioxolane (PMD). The refractive index of the copolymeric material was 1.3380 and the Knoop hardness was 4.9.

By virtue of the present invention there are provided contact lenses which are significantly improved over the lenses disclosed in the prior art. Notably, the contact lenses of the invention, by virtue of being constructed of materials characterized by indices of refraction approximating that of human tears, can be contour fitted to the eye to provide a perfect fit and thus enable the lenses to be worn for periods of time considerably exceeding the periods during which conventional lenses may be worn. Furthermore, the lenses of the invention have been found to reduce and often eliminate the aberrations due to reflected light which occur with ordinary contact lenses.

It should be understood that while the present invention has been described in considerable detail with respect to certain specific embodiments thereof, it is not to be considered limited to those embodiments, but may be used in other ways without departure from the spirit of the invention or the scope of the appended claims.

We claim:

**1.** A contact lens for providing optical correction to a human eye, said lens having a generally concavo-convex cross section with the concave surface adjacent to the eye and comprising a transparent, dimensionally stable, nontoxic polymer characterized by an index of refraction no greater than 1.40 and closely matching the index of refraction of human tears, and selected from the group consisting of polymers of hexafluoroacetone-tetrafluoroethylene-ethylene, polymers of perfluoroalkylethyl methacrylates, and polymers of perfluoro-2-methylene-4-methyl-1,3-dioxolane.

**2.** The contact lens of claim **1** in which the posterior surface of said lens conforms with the topography of a human eye, and said polymer is characterized by an index of refraction of no greater than 1.37.

**3.** The contact lens of claim **2** in the form of a scleral lens.

**4.** The contact lens of claim **1** characterized by an index of refraction no greater than 1.35.

**5.** The contact lens of claim **1** in which said transparent dimensionally stable, nontoxic polymer comprises a polymer of hexafluoroacetone-tetrafluoroethylene-ethylene.

**6.** The contact lens of claim **1** in which said transparent, dimensionally stable, nontoxic polymer comprises a polymer of a perfluoroalkylethyl methacrylate.

**7.** The contact lens of claim **6** in which the transparent, dimensionally stable, nontoxic polymer comprises a polymerized perfluoroalkylethyl methacrylate in which the alkyl group contains from 3 to 14 carbon atoms.

**8.** The contact lens of claim **7** in which the transparent, dimensionally stable, nontoxic polymer comprises a polymerized perfluoroalkylethyl methacrylate in which the alkyl group contains 3 carbon atoms.

**9.** The contact lens of claim **1** in which said transparent, dimensionally stable, nontoxic polymer comprises a polymer of perfluoro-2-methylene-4-methyl-1,3-dioxolane.

**10.** The contact lens of claim **9** in which the transparent, dimensionally stable, nontoxic polymer comprises a copolymer of perfluoro (2-methylene-4-methyl-1,3-dioxolane) and tetrafluoroethylene.

**11.** The contact lens of claim **10** in which said copolymer is composed of from 50 to 95 percent by weight of perfluoro (2-methylene-4-methyl-1,3-dioxolane) and from 5 to 50 percent by weight of tetrafluoroethylene.